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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.														
10/656,986	09/04/2003	Shin-Rung Lu	67,200-1145	9353														
7590 TUNG & ASSOCIATES Suite 120 838 W. Long Lake Road Bloomfield Hills, MI 48302		07/26/2007	<table border="1"><tr><td colspan="2">EXAMINER</td></tr><tr><td colspan="2">DOTY, HEATHER ANNE</td></tr><tr><td>ART UNIT</td><td>PAPER NUMBER</td></tr><tr><td>2813</td><td></td></tr><tr><td colspan="2"><table border="1"><tr><td>MAIL DATE</td><td>DELIVERY MODE</td></tr><tr><td>07/26/2007</td><td>PAPER</td></tr></table></td></tr></table>		EXAMINER		DOTY, HEATHER ANNE		ART UNIT	PAPER NUMBER	2813		<table border="1"><tr><td>MAIL DATE</td><td>DELIVERY MODE</td></tr><tr><td>07/26/2007</td><td>PAPER</td></tr></table>		MAIL DATE	DELIVERY MODE	07/26/2007	PAPER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/656,986	<b>Applicant(s)</b> LU ET AL.	
	<b>Examiner</b> Heather A. Doty	<b>Art Unit</b> 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-18, 20 and 21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18, 20 and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

This action is in response to the amendment dated 4/25/2007. Claims 18 and 20-21 remain pending in the application.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless – (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-10, 12-18, and 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Subramanian et al. (U.S. 6,803,178).

Regarding claim 1, Subramanian et al. teaches a method for exposing a blanket photoresist layer (23 in Fig. 4A) to achieve optimal photoexposure conditions to produce different non-overlapping die patterns comprising:

providing a substrate (61 in Fig. 7) having formed thereover a photoresist layer; and exposing within a single die region within the photoresist layer a minimum of two non-overlapping die sub-patterns while employing a minimum of two masks, each of said masks associated with one of said non-overlapping die sub-patterns, each of said non-overlapping die patterns comprising a different pattern complexity, said pattern complexity including shape, each of said non-overlapping die patterns subjected to a different photoexposure condition (Figs. 4A-4D, 5A-5D; column 4, lines 18-column 5,

line 50; since the “shape” of the pattern on the left in Fig. 4A includes three lines while the “shape” of the pattern on the right includes two lines, they are different).

Regarding claim 6, Subramanian et al. teaches a method for exposing a photoresist layer (23 in Fig. 4A) to achieve optimal photoexposure conditions to produce different non-overlapping die patterns comprising:

providing a substrate (61 in Fig. 7) having formed thereover a photoresist layer; and exposing within a single die region within the photoresist layer a minimum of two non-overlapping die sub-patterns while employing a minimum of two masks and two exposure conditions, each of said masks associated with one of said non-overlapping die sub-patterns, each of said non-overlapping die patterns comprising a different pattern density (Figs. 4A-4D, 5A-5D; column 4, lines 18-column 5, line 50) and a different pattern complexity, said pattern complexity including shape, each of said non-overlapping die patterns subjected to a different photoexposure condition (Fig. 4 shows a first pattern on the left comprised of three closely spaced via patterns and a second pattern on the right comprised of two less closely spaced via patterns; since the “shape” of the pattern on the left in Fig. 4A includes three lines while the “shape” of the pattern on the right includes two lines, they are different).

Regarding claim 14, Subramanian et al. teaches a method for forming a patterned layer to achieve optimal photoexposure conditions to produce different non-overlapping die patterns comprising:

providing a substrate having formed thereover a target layer (21 in Fig. 4A) having formed thereover a photoresist layer (23 in Fig. 4A);

exposing within a single die region within the photoresist layer a minimum of two non-overlapping die sub-patterns while employing a minimum of two masks, to form an exposed photoresist layer, each of said masks associated with one of said non-overlapping die sub-patterns, each of said non-overlapping die patterns comprising a different pattern density (Figs. 4A-4D, 5A-5D; column 4, lines 18-column 5, line 50) and a different pattern complexity, said pattern complexity including shape, each of said non-overlapping die patterns subjected to a different photoexposure condition (Fig. 4 shows a first pattern on the left comprised of three closely spaced via patterns and a second pattern on the right comprised of two less closely spaced via patterns; since the "shape" of the pattern on the left in Fig. 4A includes three lines while the "shape" of the pattern on the right includes two lines, they are different);

developing the exposed photoresist layer to form a patterned photoresist layer (column 4, lines 58-67; column 5, lines 51-61); and

processing the target layer to form a processed target layer while employing the patterned photoresist layer as a mask (column 5, lines 1-10 and 62-67).

Regarding claims 2, 3, 7, 8, 15 and 16, Subramanian et al. teaches the method of claims 1, 6, and 14, and further teaches that the substrate is a semiconductor substrate or a ceramic (glass) substrate (column 6, lines 20-25).

Regarding claims 4, 5, 9, 10, 17, and 18, Subramanian et al. teaches the method of claims 1, 6, and 14, and further teaches that the photoresist layer is formed of a positive photoresist layer (Figs. 4A-4D; column 4, lines 18-20) or a negative photoresist layer (Figs. 5A-5D; column 5, lines 10-12).

Regarding claims 12, 13, and 20, Subramanian et al. teaches the method of claims 6 and 14, and further teaches that the photoexposure condition includes depth of focus and illumination (column 5, lines 29-50).

Regarding claim 21, Subramanian et al. teaches the method of claim 1, wherein each of said non-overlapping die patterns further comprises a different pattern density (Figs. 4A-4D, 5A-5D).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian et al. (U.S. 6,803,178) in view of Lai et al. (U.S. 6,187,486).

Regarding claim 11, Subramanian et al. teaches the method of claim 6 (note 35 U.S.C. 102(e) rejection above, but does not teach that the photoexposure condition includes exposure energy.

Lai et al. teaches that exposure energy is an exposure conditions that affects the linewidth of exposed photoresist (column 1, lines 48-67).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Subramanian et al., and further use a minimum of two exposure conditions including exposure energy, in order to modify the

linewidth of the photoresist patterns, as taught by Lai et al., for the various sub-pattern exposures.

### ***Response to Arguments***

Applicant's arguments filed 4/25/2007 have been fully considered but they are not persuasive.

Applicant primarily argues (p. 9-13) that Subramanian et al. teaches exposing two non-overlapping die sub-patterns that do not differ in orientation and/or shape, as required by amended claims 1, 6, and 14. However, the examiner disagrees. Fig. 4 shows a minimum of two masks (29 and 30) being used to expose a layer of photoresist (23) with two different patterns (three lines on the left and two lines on the right). It is the examiner's position that since these two patterns have different numbers of features, they also have different shapes. Therefore it remains the examiner's position that Subramanian et al. reads on claims 1, 6, and 14.

Applicant further argues (p. 13-14) that the teachings of Lai et al. do not help the examiner to produce Applicant's invention, and reiterates the arguments with respect to Subramanian et al. However, this argument is not persuasive, since the argument with respect to Subramanian et al. is not persuasive, as detailed above.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

Art Unit: 2813

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heather A. Doty, whose telephone number is 571-272-8429. The examiner can normally be reached on M-F, 8:30 - 2:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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